Table 5.1 – U.S. Primary and Delivered Energy – Overview

(Quadrillion Btu per year)

	1980	1990	2000	2001	2002	2003	2010	2020	2025
Primary Consumption by Source [1]									
Petroleum [2]	34.20	33.55	38.40	38.33	38.40	39.07	44.84	51.30	54.42
Natural Gas	20.39	19.74	23.91	22.90	23.65	22.51	26.11	30.73	31.47
Coal[3]	15.39	19.18	22.65	21.98	22.04	22.76	24.95	27.27	30.48
Nuclear	2.74	6.10	7.86	8.03	8.14	7.97	8.49	8.67	8.67
Renewable[4]	5.49	6.13	6.16	5.29	5.96	6.15	6.85	7.57	8.10
Other [5]	0.07	-0.03	0.06	-0.01	-0.01	-0.07	0.00	0.00	0.00
Total Primary	78.29	84.68	98.90	96.37	98.01	98.16	111.27	125.60	133.18
Primary Consumption by Sector									
Residential	15.85	17.04	20.51	20.25	20.94	21.23	23.47	25.56	26.62
Commercial	10.59	13.32	17.16	17.32	17.57	17.55	20.29	24.24	26.74
Industrial	32.15	31.89	34.68	32.53	32.86	32.52	35.47	38.19	39.53
Transportation	19.70	22.42	26.55	26.28	26.65	26.86	32.04	37.61	40.28
Total Primary[6]	78.29	84.67	98.90	96.38	98.03	98.16	111.27	125.60	133.18
Delivered Consumption by Sector									
Residential	7.50	6.60	7.20	6.91	6.95	7.24	12.67	13.80	14.26
Commercial	4.10	3.85	4.22	4.04	4.12	4.18	9.53	11.38	12.49
Industrial	22.67	21.21	22.80	21.83	22.13	21.69	27.35	29.66	30.76
Transportation	19.66	22.37	26.49	26.22	26.60	26.80	31.85	37.39	40.04
Total Delivered[6]	53.93	54.03	60.71	59.00	59.79	59.91	81.39	92.23	97.56

Sources: EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table A2; EIA, *Annual Energy Review 2003,* DOE/EIA-0384(2003) (Washington, D.C., September 2004), Tables 2.1a-f.

Notes:

[1] For historical figures, these values include the electric-power sector's consumption

[2] Includes natural gas plant liquids, crude oil consumed as a fuel, and non-petroleum-based liquids for blending, such as ethanol.

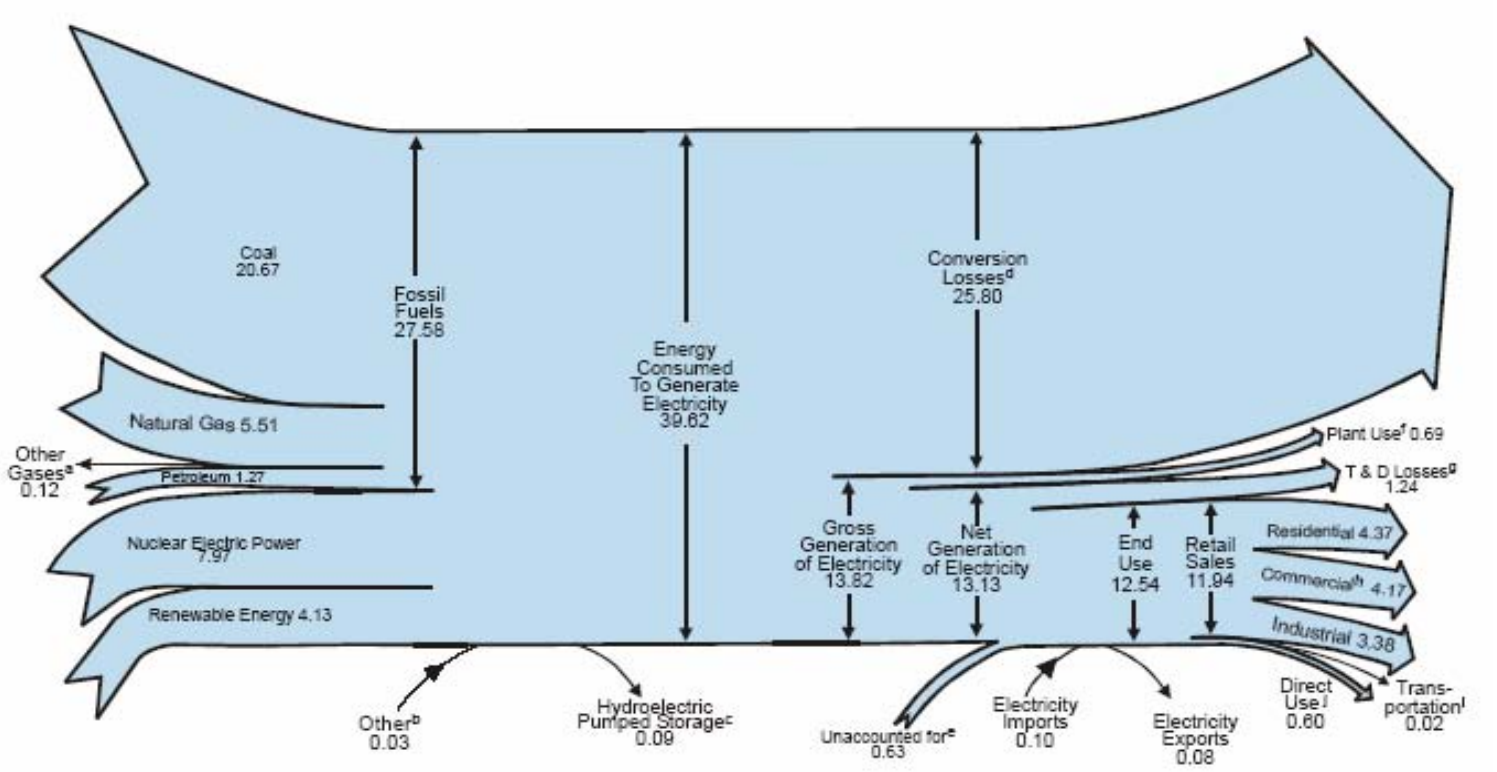
[3] Includes coal in all sectors as well as net imports of coal coke in the industrial sector

[4] Includes grid-connected electricity from conventional hydroelectric; wood and wood waste; landfill gas; municipal solid waste; other biomass; wind; photovoltaic and solar thermal sources; nonelectric energy from renewable sources, such as active and passive solar systems, and wood; and both the ethanol and gasoline components of E85, but not the ethanol components of blends less than 85 percent. Excludes electricity imports using renewable sources and nonmarketed renewable energy.

[5] For historical figures, this value includes hydroelectric pumped storage and electricity net imports. For forecasted figures, this value includes only liquid hydrogen.

[6] For historical figures, this value does not include the electric-power sector's consumption

Table 5.2 – Electricity Flow Diagram (Quadrillion Btu)



Source: EIA*, Annual Energy Review,* DOE/EIA-0384 (2003) (Washington, D.C., September 2004), Diagram 5.

Notes:

a Blast furnace gas, propane gas, and other manufactured waste gases derived from fossil fuels.

b Batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

c Pumped storage facility production minus energy used for pumping.

d Approximately two-thirds of all energy used to generate electricity. See note "Electrical System Energy Losses," at end of Section 2.

e Data collection frame differences and nonsampling error.

f Electric energy used in the operation of power plants, estimated as 5 percent of gross generation. See note "Electrical System Energy Losses," at end of Section 2.

g Transmission and distribution losses (electricity losses that occur between the point of generation and delivery to the customer) are estimated as 9 percent of gross generation. See note "Electrical System Energy Losses," at end of Section 2.

h Commercial retail sales plus approximately 95 percent of "Other" retail sales from Table 8.9.

I Approximately 5 percent of "Other" retail sales from Table 8.9.

j Commercial and industrial facility use of onsite net electricity generation; and electricity sales among adjacent or co-located facilities for which revenue information is not available.

Table 5.3 – Electricity Overview

(Billion Kilowatthours, unless otherwise noted)

	1980	1990	2000	2001	2002	2003	2010	2020	2025
Electric Power Sector Generation [1]	2,286	2,901	3,638	3,580	3,698	3,691	4,273	5,011	5,432
End-Use Sector Generation	3	137	165	157	160	157	48	74	91
Total Generation	2,290	3,038	3,802	3,737	3,858	3,848	4,322	5,085	5,522
Capability (gigawatts)									
Electric Power Sector [2]	579	710	782	819	876	923	955	1,050	1,145
End Use Sector [3]	NA	24	30	29	29	30	32	39	45
Total Capability	579	734	812	848	905	953	987	1,089	1,190
Imports from Canada/Mexico	25	18	49	39	36	30	31	31	25
Exports to Canada/Mexico	4	16	15	16	14	24	22	16	14
Loss and Unaccounted for [4]	216	214	231	215	241	179	NA	NA	NA
Retail Sales [5]	2,094	2,713	3,421	3,370	3,463	3,500	4,070	4,811	5,220
Direct Use [6]	NA	114	183	174	178	175	204	229	248
Total Use	2,094	2,827	3,605	3,544	3,641	3,675	4,274	5,040	5,467

Sources: EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Tables A8, A9 and A10; EIA, *Annual Energy Review 2003,* DOE/EIA-0384 (2003) (Washington, D.C., September 2004), Tables 8.1, 8.11a, 8.11b, and 8.11d.

Notes:

[1] Electricity-only and combined-heat-and-power (CHP) plants within the NAICS 22 category whose primary business is to sell electricity, or electricity and heat, to the public. Through 1988, data are for electric utilities only; beginning in 1989, data are for electric utilities and independent power producers.

[2] Through 1988, data are for net summer capacity at electric utilities only. Beginning in 1989, data also include net summer capacity at independent power producers, commercial plants, and industrial plants. All data include electric sector combined-heat-and-power (CHP) plants beginning after 1989.

[3] Commercial and industrial combined-heat-and-power (CHP) and electricity-only plants. Data begins in 1989.

[4] Electricity losses that occur between the point of generation and delivery to the customer, and data collection frame differences and nonsampling error.

[5] Electricity retail sales to ultimate customers reported by electric utilities and other energy service providers.

[6] Commercial and industrial facility use of onsite net electricity generation; and electricity sales among adjacent or co-located facilities for which revenue information is not available.

Table 5.4 - Consumption of Fossil Fuels by Electric Generators

	1980	1990	2000	2001	2002	2003	2010	2020	2025
Coal (million short tons) [1]	569	781	983	962	975	1,002	1,139	1,267	1,425
Distillate Fuel Oil (million barrels) [2]	29	16	30	29	22	28	68	72	77
Residual Fuel Oil (million barrels) [3]	391	183	138	159	105	137	138	156	157
Petroleum Coke (million short tons)	0.2	1.0	3.2	3.3	5.7	5.7	NA	NA	NA
Other Liquids (million barrels) [4]	NA	0.02	0.4	0.4	1.2	1.9	NA	NA	NA
Total Petroleum (million barrels) [5]	421	205	184	205	156	196	206	228	233
Natural Gas (billion cubic feet)	3,682	3,147	5,014	5,142	5,408	4,688	6,740	9,451	9,426
Stocks of Coal and Petroleum (end of year)									
Coal (million short tons)	183	156	102	138	142	121	NA	NA	NA
Petroleum (million barrels) [7]	136	84	41	57	52	52	NA	NA	NA

Sources: EIA, *Annual Energy Outlook 2005*, DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Tables A2, A13 and A15; EIA, *Annual Energy Review 2003,* DOE/EIA-0384(2003) (Washington, D.C., September 2004), Table 8.5b and 8.8.

Notes:
Data is for electric power sector consumption only. Data include fuel consumption to produce electricity by combined heat and power plants. Through 1988, consumption data are for electric utilities only. Beginning in 1989, consumption data also include independent power producers.

[1] Anthracite, bituminous coal, subbituminous coal, lignite, waste coal, and synthetic coal.

[2] Light fuel oil (nos. 1, 2, and 4). For 1949-1979, data are for gas turbine and internal combustion plant use of petroleum. For 1980-2000, electric utility data also include small amounts of kerosene and jet fuel. Forecast values calculated from quadrillion Btu using conversion factor 5.825 MMBtu/barrel.

[3] Heavy fuel oil (nos. 5 and 6). For 1949-1979, data are for steam plant use of petroleum. For 1980-2000, electric utility data also include a small amount of fuel oil no. 4. Forecast values calculated from quadrillion Btu using conversion factor 6.287 MMBtu/barrel.

[4] Jet fuel, kerosene, other petroleum liquids, and waste oil.

[5] Petroleum coke is converted from short tons to barrels by multiplying by 5. In forecasted values, total petroleum is calculated sum.

[6] Through 1998, data are for electric utilities only. Beginning in 1999, data are for electric utilities and independent power producers.

[7] Includes distillate fuel oil, residual fuel oil, other liquids and petroleum coke.

Table 5.5 – Electric Power Sector Energy Consumption

(Trillion Btu)

	1980	1990	2000	2001	2002	2003	2010	2020	2025
Coal	12,123	16,235	20,185	19,494	19,733	20,419	22,812	25,279	28,544
Natural Gas	3,810	3,224	5,120	5,271	5,522	4,805	6,874	9,640	9,615
Petroleum	2,634	1,281	1,145	1,270	955	1,200	1,263	1,400	1,432
Other Gas [1]	NA	6	19	9	25	13	NA	NA	NA
Total Fossil Fuels	18,567	20,746	26,470	26,044	26,235	26,437	30,949	36,320	39,591
Nuclear Electric Power	2,739	6,104	7,862	8,033	8,143	7,973	8,490	8,666	8,666
Hydroelectric Pumped Storage [2]	---	-36	-57	-90	-88	-88	NA	NA	NA
Conventional Hydroelectric	2,867	3,014	2,768	2,169	2,636	2,722	3,084	3,083	3,083
Wood	3	106	126	116	141	152	323	365	399
Waste	2	180	294	314	353	336	344	353	354
Geothermal	110	326	296	289	305	276	271	607	925
Solar [3]	NA	4	5	6	6	5	11	17	20
Wind	NA	29	57	68	105	108	266	325	355
Total Renewable Energy	2,982	3,658	3,547	2,962	3,545	3,600	4,299	4,750	5,136
Electricity Imports	71	8	115	75	78	22	31	52	38
Other [4]	NA	0.08	1.28	0.00	6.96	1.37	NA	NA	NA
Total Primary Consumption	24,359	30,481	37,939	37,024	37,919	37,945	43,769	49,789	53,431

Sources: EIA, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, D.C., September 2004), Table 8.4b and EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (20045 (Washington, D.C., February 2005), Tables A2 and A17.

Notes:

Data are for fuels consumed to produce electricity at both electricity-only and at combined heat and power plants. Through 1988, data are for consumption at electric utilities only. Beginning in 1989, data also include consumption at independent power producers.

[1] Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels.

[2] Pumped storage facility production minus energy used for pumping. 1980 data included in Conventional Hydroelectric.

[3] Solar thermal and photovoltaic energy.

[4] Batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, and miscellaneous technologies.

NA = Not Available

Table 5.6 – Fossil Fuel Generation by Age of Generating Units

(Megawatts)

	1980	1990	2000	2001	2002	2003	2004
<5 years	91,001	39,870	54,274	90,877	155,534	204,504	218,854
6-10 years	136,236	54,270	44,042	42,164	37,735	33,121	33,234
11-20 years	145,618	224,879	92,854	87,057	82,977	83,140	81,085
21-30 years	99,223	143,868	221,690	210,982	196,464	175,461	156,694
31-40 years	21,042	93,450	141,055	155,292	172,139	188,274	205,136
41-50 years	4,023	14,701	86,582	91,321	94,204	95,560	93,156
>50 years	4,232	2,566	11,634	15,259	18,161	24,487	33,967
Total	501,376	573,603	652,129	692,952	757,214	804,546	822,128

Source: *PowerDat*, © 2005, Platts, a division of the McGraw-Hill companies. Query by NREL 3/05.
Notes:
Total MW does not equal fossil fuel-generation capacity cited in Table 6.1.
Capacity reported in this table is nameplate capacity

Table 5.7 – Nuclear Generation by Age of Generating Units

(Megawatts)

	1980	1990	2000	2001	2002	2003	2004
<5 years	16,289	30,408	1,270	0	0	0	0
6-10 years	33,989	25,628	1,215	2,485	2,485	1,270	1,270
11-20 years	6,413	48,929	56,036	51,537	49,189	47,200	40,278
21-30 years	309	6,073	44,597	46,859	43,105	41,420	39,315
31-40 years	0	0	4,095	6,332	12,435	17,324	26,351
Total	57,000	111,039	107,214	107,214	107,214	107,214	107,214

Source: *PowerDat*, © 2005, Platts, a division of the McGraw-Hill companies. Query by NREL 3/05.

Notes:
Total MW does not equal nuclear generation capacity cited in Table 6.1.
Capacity reported in this table is nameplate capacity

Table 5.8 – Operational Renewable Energy Generating Capacity

(Megawatts)

	1980	1990	2000	2001	2002	2003 [1]
Agricultural Residues[2]	40	165	373	373	373	373
BioGas[3]	18	361	933	999	1,030	1,053
Municipal Solid Waste[4]	263	2,172	2,970	2,970	2,970	3,000
Timber Residues[5]	3,576	6,305	7,447	7,458	7,497	7,497
Bioenergy Total [6]	3,897	9,003	11,722	11,800	11,869	11,922
Geothermal	802	2,540	2,779	2,779	2,779	2,779
Photovoltaic [7]	0.025	4.170	27.645	38.452	59.703	67.710
Solar Thermal	0	274	354	354	354	354
Hydro [8]	80,491	90,955	94,324	94,335	94,335	94,356
Wind	0.06	1,569	2,780	4,623	5,078	5,090
Total	85,190	104,344	111,987	113,930	114,475	114,569

Source: Renewable Electric Plant Information System (REPiS Database), Version 7, National Renewable Energy Laboratory, 2003, http://www.nrel.gov/analysis/repis/.

Notes:

Totals do not equal renewable generation capacity cited in Table 6.1.

[1]2003 data is preliminary; it is not verified at time of Data Book release

[2]Agricultural residues, cannery wastes, nut hulls, fruit pits, nut shells

[3]Biogas, alcohol (includes butahol, ethanol, and methanol), bagasse, hydrogen, landfill gas, livestock manure, wood gas (from wood gasifier)

[4]Municipal solid waste (includes industrial and medical), hazardous waste, scrap tires, wastewater sludge, refused-derived fuel

[5]Timber and logging residues (Includes tree bark, wood chips, saw dust, pulping liquor, peat, tree pitch, wood or wood waste)

[6] There are an additional 65.45 MW of ag waste, 5.445 MW of bio gas, and 483.31 MW of wood residues that are not accounted for here because they have no specific online date.

[7] There are an additional 3.4 MW of photovoltaic capacity that are not accounted for here because they have no specific online date.

[8] There are an additional 24 MW of hydroelectric capacity that are not accounted for here because they have no specific online date.

Table 5.9 – Number of Utilities by Class of Ownership and Nonutilities

	1980	1990	1999	2000	2002	2003
Investor Owned Utilties	240	266	239	240	217	219
Federally Owned Utilities	41	10	9	9	12	12
Cooperatively Owned Utilities[1]	936	951	900	894	889	895
Other Publicly Owned Utilities	1,753	2,010	2,012	2,009	1,870	1,886
Total Number of Utilities	2,970	3,237	3,160	3,152	2,988	3,012
Nonutilities			1,930		511	617

Source: EIA, *The Changing Structure of the Electric Power Industry 2000: An Update*; UDI/Platts Energy, *Platts directory of electric power producers and distributors 109th edition*, The McGraw-Hill Companies.

Notes:
[1] Co-ops operate in all states except Connecticut, Hawaii, Rhode Island, and the District of Columbia

Note: 2001 data is not reported, but is available from the publishers (Platts)

Table 5.10 – Top 10 Investor-Owned Utilities

Utility by Sales (Million kWh)	1990		2000		2001		2002		2003	
	Rank	Million kWh	Rank	Million kWh	Rank	Million kWh	Rank	Million kWh	Rank	Million kWh
Florida Power & Light Co.	5	65,222	2	88,128	2	90,495	1	95,543	1	99,339
TXU Electric Co.	1	78,340	1	100,885	1	102,526	2	90,522	2	79,050
Georgia Power Co.	8	53,953	4	74,434	5	72,545	3	75,432	3	75,018
Duke Energy Corp	7	58,359	9	53,726	4	72,977	4	75,362	4	73,763
Virginia Electric & Power Co.	9	52,122	8	65,294	7	67,858	6	71,477	5	72,197
Commonwealth Edison Co.	2	70,852	3	77,176	3	76,918	5	73,835	6	68,384
Southern California Edison Co.	4	70,063	6	73,686	8	52,034	7	54,391	7	52,229
Alabama Power Co.	12	38,081	10	52,068	9	49,338	8	52,073	8	52,208
PacifiCorp	10	40,288	43	18,859	11	47,708	11	47,030	9	48,339
Pacific Gas & Electric Co.	3	70,597	7	72,121	12	46,680	9	49,830	10	47,881
Detroit Edison Co	11	39,674	11	50,131	10	48,089	10	48,346	11	43,672
Reliant Energy HL&P	6	58,583	5	73,716	6	69,839	16	35,423	17	34,694

Utility by Revenue (Million $)	1990		2000		2001		2002		2003	
	Rank	Million $	Rank	Million $	Rank	Million $	Rank	Million $	Rank	Million $
Florida Power & Light Co.	4	4,803	4	6,065	3	7,302	2	7,028	1	7,952
Southern California Edison Co.	1	6,767	1	7,416	1	7,782	1	7,848	2	6,845
TXU Electric Co.	6	4,200	3	6,433	2	7,748	4	6,520	3	6,437
Pacific Gas & Electric Co.	2	6,513	2	6,988	4	7,171	3	6,821	4	6,369
Consolidated Edison Co-NY Inc.	5	4,385	6	5,286	6	5,622	6	4,874	5	5,380
Commonwealth Edison Co.	3	5,668	5	5,723	5	5,703	5	5,457	6	5,123
Virginia Electric & Power Co.	10	3,299	9	4,022	7	4,340	7	4,611	7	4,665

Duke Energy Corp	7	3,681	12	3,151	9	4,159	8	4,345	8	4,335
Georgia Power Co.	9	3,426	8	4,283	8	4,305	9	4,288	9	4,310
Public Service Electric&Gas Co.	11	3,262	11	3,247	11	3,563	10	3,639	10	3,518
Reliant Energy HL&P	8	3,436	7	4,743	10	5,622	14	2,898	11	3,437
Detroit Edison Co.	12	3,187	10	3,834	12	3,511	11	3,494	13	3,193

Source: EIA, *Electric Sales and Revenue*, DOE/EIA -0540 (00) (Washington, D.C., December 2003), Table 17.

Table 5.11 – Top 10 Independent Power Producers Worldwide

(Megawatts)

Company	2002 Capacity (MW)	2003 Capacity (MW)
Tractebel Electricity & Gas Int'l	50,000	48,317
ENEL SpA.	46,456	45,744
AES	55,660	44,917
Entergy Wholesale Operations	21,323	30,000
Calpine	19,319	29,891
Dominion Generation	23,830	24,408
Mirant	22,100	23,254
NRG Energy	20,954	21,200
Reliant	22,349	19,442
Edison Mission Energy	18,688	18,733

Source: Company 10K SEC filings at http://www.sec.gov/ accessed 7/04

Table 5.12 – Utility Mergers and Acquisitions

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Pending
Mergers/Acquisitions																		
IOU-IOU	4	1	2	1	7	4	1	3	1	5	10	4	10	3	7	2	2	2
Co-op-Co-op	4	3	2	2	7	2	1	4	2	13	15	15	3	3		2		
IOU-Co-op				1	2			1		1					1			
IOU-Gas [1]									1	5	4	3	6	1				
Muni-Muni								1				2				1	1	
Muni-Co-op										1			1					
Power Authority-IOU											1							
Nonutility-IOU													6	1		3		1
Nonutility-Muni																1		
Foreign-IOU [2]												2	1	3	1			
Total	8	4	4	4	16	6	2	9	4	25	30	26	27					
Related Activities																		
Name Changes									5	2	7	11	1	4	6	3	3	
New Holding Company										1	5	4	2	3		2	2	
Moved Headquarters						1												
Ceased Operations											1					1		

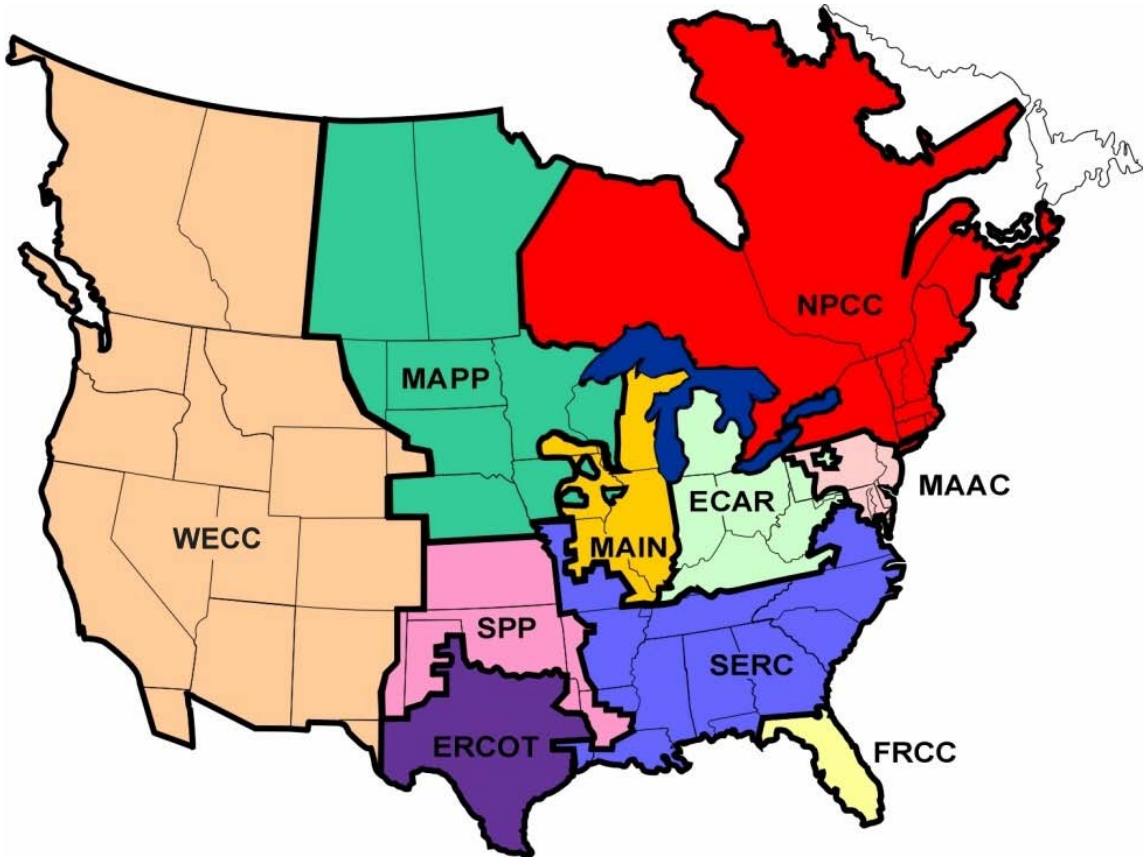
Source: Calculated from UDI/Platts Energy, *Platts directory of electric power producers and distributors 109th edition*, The McGraw-Hill Companies

Notes:

[1] Gas local distribution company, pipeline, or developer

[2] Excludes Canadian mergers and acquisitions. Includes foreign acquisition of U.S. companies

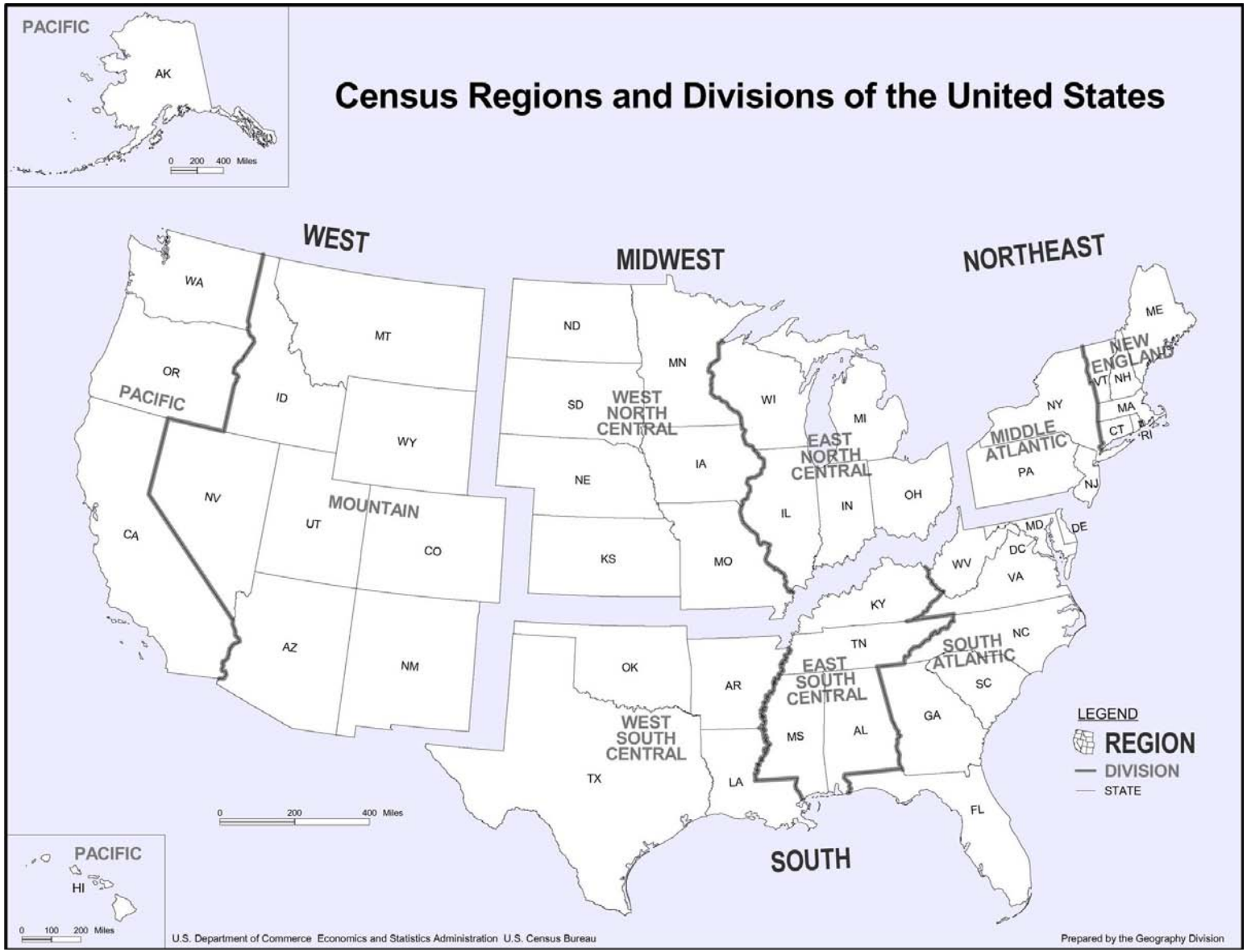
Table 5.13a – North American Electric Reliability Council Map for the United States



ECAR	**ECAR East Central Area Reliability Coordination Agreement**	**NPCC**	**Northeast Power Coordinating Council**
ERCOT	**Electric Reliability Council of Texas**	**SERC**	**Southeastern Electric Reliability Council**
FRCC	**Florida Reliability Coordinating Council**	**SPP**	**Southwest Power Pool**
MAAC	**Mid-Atlantic Area Council**	**WECC**	**Western Electricity Coordinating Council**
MAIN	**Mid-Atlantic Interconnected Network**	**ASCC**	**Alaskan Systems Coordinating Council**
MAPP	**Mid-Continent Area Power Pool**		

Source: North American Electric Reliability Council, www.nerc.com

Table 5.13b – Census Regions



Source: U.S. Department of Commerce, Bureau of the Census, www.census.gov